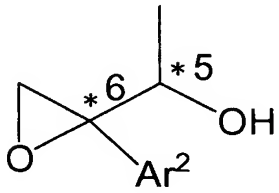
CLAIMS

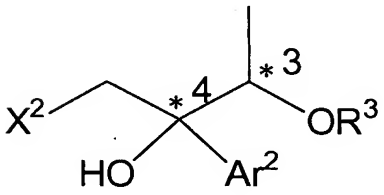
1. A process for producing an optically active epoxy alcohol derivative represented by general formula (14):



(14)

(wherein Ar^2 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; and each of *5 and *6 represents an asymmetric carbon), the process comprising:

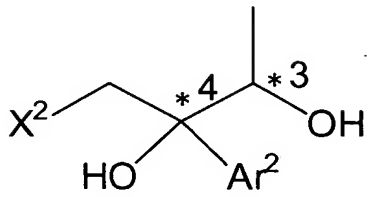
subjecting a compound represented by general formula (6):



(6)

(wherein X^2 represents a halogen atom; R^3 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle; Ar^2 is the same as above; and each of *3 and *4 represents an asymmetric carbon) to at least one treatment selected from acid treatment, fluorine compound treatment, and hydrogenolysis to prepare an

optically active halo diol derivative represented by general formula (13):

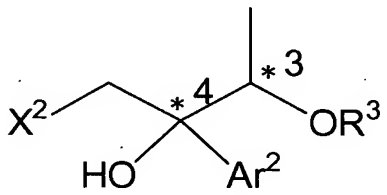


(13)

(wherein X^2, Ar^2, *3, and *4 are the same as above), and then treating the resulting halo diol derivative with a base; or the process comprising:

treating the compound represented by said general formula (6) with a base.

2. A process for producing an optically active halohydrin derivative represented by general formula (6):

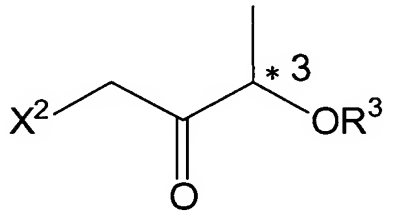


(6)

(wherein X^2 represents a halogen atom; R^3 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle; Ar^2 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; and each of *3 and *4 each represents an

asymmetric carbon), the process comprising:

allowing an optically active haloketone derivative represented by general formula (4):



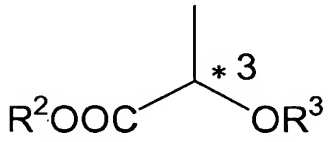
(4)

(wherein X^2, R^3, and *3 are the same as above) to react with a compound represented by general formula (5):

$$Ar^2M^2 \quad (5)$$

(wherein Ar^2 is the same as above; and M^2 represents an alkali metal or a halogenated alkaline-earth metal).

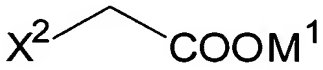
3. The process according to claim 2, wherein the optically active haloketone derivative represented by said general formula (4) is prepared by allowing an optically active propionate compound represented by general formula (2);



(2)

(wherein R^2 represents a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms; R^3 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having

7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle; and *3 represents an asymmetric carbon) to react with an enolate prepared by reaction of a haloacetic acid derivative represented by general formula (3):



(3)

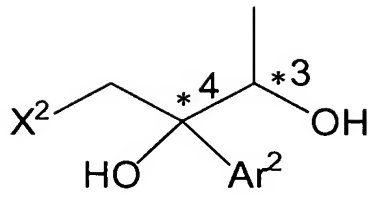
(wherein X2 is same as above; and M1 represents hydrogen, an alkali metal or a halogenated alkaline-earth metal) with a base, and then subjecting the resulting compound to acid treatment.

4. The process according to claim 3, wherein the base is tert-butylmagnesium chloride.

5. The process according to claim 3 or 4, wherein the compound represented by said general formula (2) is allowed to react with the compound represented by said general formula (3) in the presence of an amine.

6. The process according to claim 1, wherein the compound represented by said general formula (6) prepared by any one of processes according to claims 2 to 5 is used.

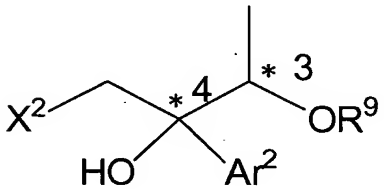
7. A process for producing an optically active halo diol derivative represented by general formula (13):



(13)

(wherein X^2 represents a halogen atom; Ar^2 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; and each of *3 and *4 represents an asymmetric carbon), the process comprising:

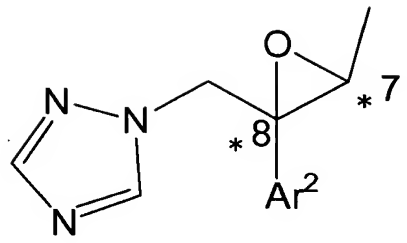
subjecting a compound represented by general formula (6a):



(6a)

(wherein X^2, Ar^2, *3, and *4 are the same as above; and R^9 represents a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, or a substituted or unsubstituted heterocycle) to at least one treatment selected from acid treatment, fluorine compound treatment, and hydrogenolysis.

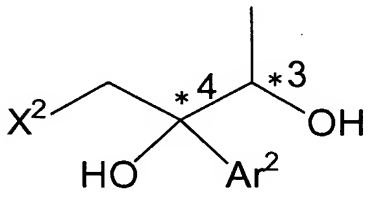
8. A process for producing an optically active epoxide derivative represented by general formula (16):



(16)

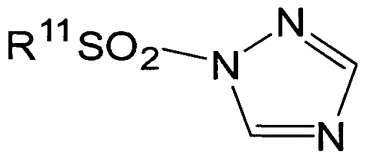
(wherein Ar^2 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; and each of *7 and *8 represents an asymmetric carbon), the process comprising:

allowing an optically active halo diol derivative represented by general formula (13):



(13)

(wherein X^2 represents a halogen atom; Ar^2 is the same as above; and each of *3 and *4 represents an asymmetric carbon) to react with a compound represented by general formula (15):



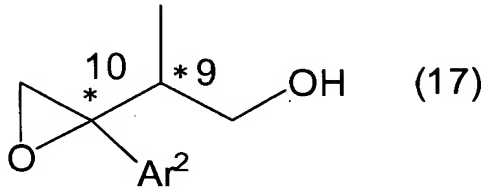
(15)

(wherein R^{11} represents a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms).

9. The process according to claim 8, wherein the compound

represented by said general formula (13) prepared by the process according to claim 7 is used.

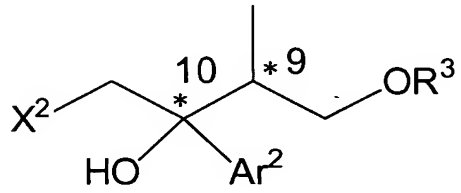
10. A process for producing a compound represented by general formula (17):



(17)

(wherein Ar^2 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; and each of *9 and *10 represents an asymmetric carbon), the process comprising:

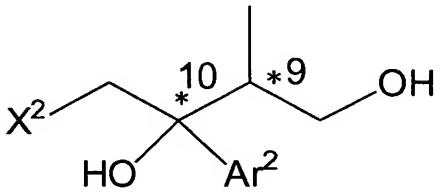
subjecting a compound represented by general formula (19):



(19)

(wherein X^2 represents a halogen atom; R^3 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle; and Ar^2, *9, and *10 are the same as above) to at least one treatment selected from acid treatment, fluorine compound treatment, and hydrogenolysis to prepare an optically active halodiol derivative

represented by general formula (20):

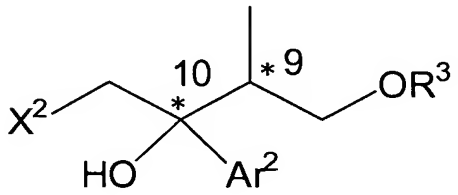


(20)

(wherein X^2, Ar^2, *9, and *10 are the same as above), and then treating the resulting diol derivative with a base; or the process comprising:

treating the compound represented by said general formula (19) with a base.

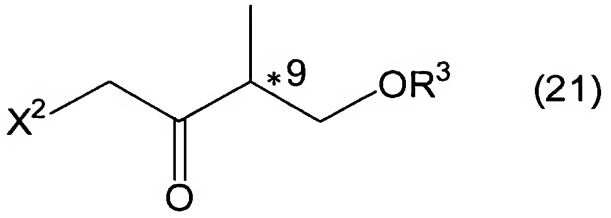
11. A process for producing an optically active halohydrin derivative represented by general formula (19):



(19)

(wherein X^2 represents a halogen atom; R^3 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle; Ar^2 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; and each of *9 and *10 represents an asymmetric carbon), the process comprising:

allowing an optically active haloketone derivative represented by general formula (21):



(21)

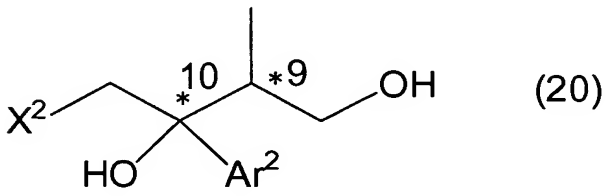
(wherein X^2, R^3, and *9 are the same as above) to react with a compound represented by general formula (5):

$$Ar^2M^2 \quad (5)$$

(wherein Ar^2 is the same as above; and M^2 is an alkali metal or a halogenated alkaline-earth metal).

12. The process according to claim 10, wherein the compound represented by said general formula (19) prepared by the process according to claim 11 is used.

13. A process for producing an optically active halo diol derivative represented by general formula (20):

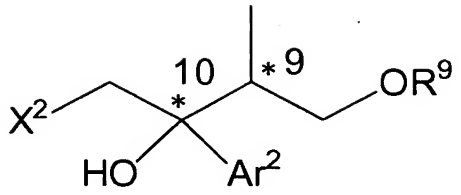


(20)

(wherein X^2 represents a halogen atom; Ar^2 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; and each of *9 and *10 represents an asymmetric carbon), the process comprising:

subjecting a compound represented by general formula

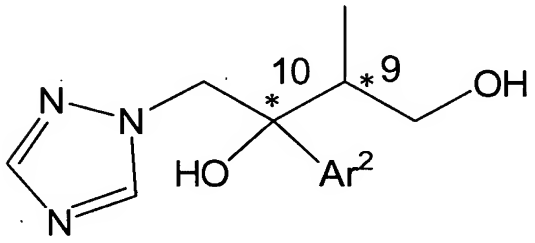
(19a):



(19a)

(wherein X^2, Ar^2, *9, and *10 are the same as above; and R^9 represents a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, or a substituted or unsubstituted heterocycle) to at least one treatment selected from acid treatment, fluorine compound treatment, and hydrogenolysis.

14. A process for producing a compound represented by general formula (18):

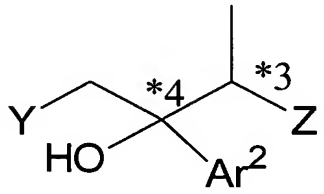


(18)

(wherein Ar^2, *9, and *10 are the same as above), the process comprising:

allowing the compound represented by said general formula (17) prepared by the process according to claim 10 or 12 to react with 1,2,4-triazole.

15. A process for producing an optically active hydroxy compound represented by general formula (12):

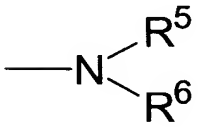


(12)

(wherein Y represents a halogen atom or a substituted or unsubstituted heterocycle; Ar^2 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; each of *3 and *4 represents an asymmetric carbon; and Z represents general formula (8):

$$-O-R^4 \quad (8)$$

[wherein R^4 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle], general formula (9):



(9)

[wherein R^5 and R^6 independently represent hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon

atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, a substituted or unsubstituted alkyloxycarbonyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aralkyloxycarbonyl group having 7 to 20 carbon atoms, or a substituted or unsubstituted aryloxycarbonyl group having 6 to 20 carbon atoms], general formula (10):

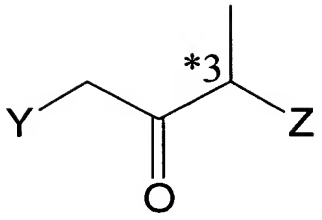
$$-SO_n-R^7 \quad (10)$$

[wherein R^7 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms; and n represents an integer of 0 to 2], or general formula (11):

$$-CH_2OR^8 \quad (11)$$

[wherein R^8 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle]), the process comprising:

allowing a compound represented by general formula (7):



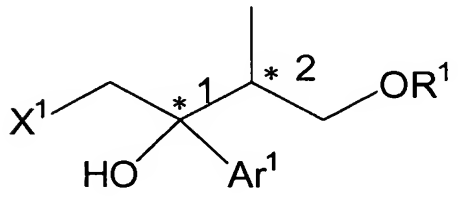
(7)

(wherein Y, Z, and *3 are the same as above) to react with a compound represented by general formula (5):

$$Ar^2M^2 \quad (5)$$

(wherein Ar^2 is the same as above; and M^2 represents an alkali metal or a halogenated alkaline-earth metal).

16. An optically active halohydrin derivative represented by general formula (1):



(1)

(wherein X^1 represents a halogen atom; Ar^1 represents a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; R^1 represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle; and each of *1 and *2 represents an asymmetric

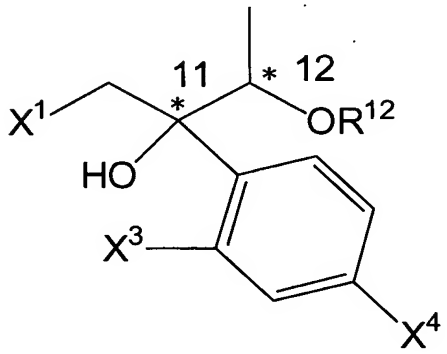
carbon).

17. The halohydrin derivative according to claim 16, wherein Ar^1 represents 2,4-difluorophenyl group or 2,5-difluorophenyl group.

18. The halohydrin derivative according to claim 16 or 17, wherein R^1 represents tert-butyldimethylsilyl group, pivaloyl group, or tetrahydropyranyl group.

19. The halohydrin derivative according to any one of claims 16 to 18, wherein R^1 represents pivaloyl group.

20. An optically active halohydrin derivative represented by general formula (22):



(22)

(wherein each of X^1, X^3, and X^4 represents a halogen atom; R^{12} represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted aralkyl group having 8 to 20 carbon atoms, a substituted or

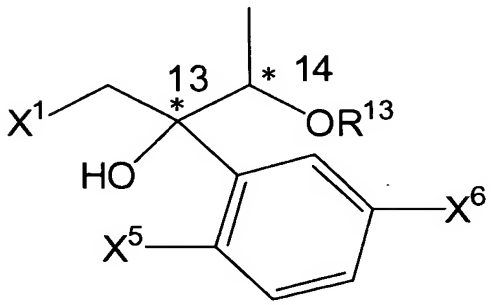
unsubstituted silyl group, or an aliphatic acyl group; and each of *11 and *12 represents an asymmetric carbon).

21. The halohydrin derivative according to claim 20, wherein each of X^3 and X^4 represents fluorine.

22. The halohydrin derivative according to claim 20 or 21, wherein R^{12} represents tert-butyldimethylsilyl group or pivaloyl group.

23. The halohydrin derivative according to any one of claims 20 to 22, wherein R^{12} represents pivaloyl group.

24. An optically active halohydrin derivative represented by general formula (23):



(23)

(wherein each of X^1, X^5, and X^6 represents a halogen atom; R^{13} represents hydrogen, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, a substituted or unsubstituted

aralkyl group having 7 to 20 carbon atoms, a substituted or unsubstituted silyl group, a substituted or unsubstituted acyl group having 1 to 20 carbon atoms, or a substituted or unsubstituted heterocycle; and each of *13 and *14 represents an asymmetric carbon).

25. The halohydrin derivative according to claim 24, wherein each of X^5 and X^6 represents fluorine.

26. The halohydrin derivative according to claim 24 or 25, wherein R^{13} represents tert-butyldimethylsilyl group, pivaloyl group, or tetrahydropyranyl group.

27. The halohydrin derivative according to any one of claims 24 to 26, wherein R^{13} represents pivaloyl group.